

Raft River Subbasin Assessment and Total Maximum Daily Loads

Raft River Watershed, City of Rocks area



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and
Total Maximum Daily Loads

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Abbreviations, Acronyms, and Symbols

§303(d) Refers to section 303 subsection (d) of the Clean Water Act, or a list of impaired water bodies required by this section	CFR Code of Federal Regulations (refers to citations in the federal administrative rules)
μ micro, one-one thousandth	cfs cubic feet per second
μg/L microgram per liter	col Colonies
μmhoms/cm microhom per centimeter	CWA Clean Water Act
§ Section (usually a section of federal or state rules or statutes)	DEQ Department of Environmental Quality
7Q2 lowest seven day average flow in a two year period.	DO dissolved oxygen
AFO Animal feeding operation	EA Environmental assessment
AMP Allotment Management Plan	<i>E. coli</i> <i>Escherichia coli</i>
BAER Burned Area Emergency Rehabilitation	EPA United States Environmental Protection Agency
BLM United States Bureau of Land Management	ESA Endangered Species Act
BMP best management practice	F Fahrenheit
BOD biochemical oxygen demand	ft feet
BOR United States Bureau of Reclamation	GIS Geographical Information Systems
BURP Beneficial Use Reconnaissance Program	H_a Alternative hypothesis
C Celsius, Centigrade	HIP Habitat improvement project
C&H Cattle and Horse	H_o Null Hypothesis
CAFO Confined Animal Feeding Operation	HUC Hydrologic Unit Code
	IDA Idaho Department of Agriculture
	IDT Idaho Department of Transportation
	IDAPA Refers to citations of Idaho administrative rules

IDFG	Idaho Department of Fish and Game	MOS	Margin of safety
IDL	Idaho Department of Lands	N	Nitrogen
IDWR	Idaho Department of Water Resources	n.a.	Not applicable
ISCC	Idaho Soil Conservation Commission	nc	Not collected
km	kilometer	NO_x	General symbol for nitrite and nitrate in a solution
km²	square kilometer	NB	natural background
kwh/m²/day	Kilowatt per hour per square meter per day	NH₃	Ammonia
LA	load allocation	PLS	pure live seed
LC	load capacity	NPDES	National Pollutant Discharge Elimination System
m	meter	NRCS	Natural Resources Conservation Service
m³	cubic meter	P	Phosphorus
m³/s	cubic meter per second	RM	River mile
MDEQ	Montana Department of Environmental Quality	S&G	Sheep and Goat
Mg	Megagram or Metric Ton	SBA	subbasin assessment
Mg/y	Metric ton per year	SCC	Soil Conservation Commission
mg/L	milligrams per liter	SCD	Soil Conservation District
mg/m²	milligram per square meter	SCS	Soil Conservation Service
mi	mile	SMZ	Streamside Management Zone
mi²	square miles	SPCC	Spill Prevention Control and Countermeasures
ml	milliliter	SR-HC	Snake River Hells canyon
mm	millimeter	TMDL	

TDS total dissolved solids

TFRO Twin Falls regional Office

TMDL total maximum daily load

TN Total nitrogen

TP total phosphorus

TSS total suspended solids

TSI Trophic State Index

t/y tons per year

U.S. United States

USC United States Code

USDA United States Department of
Agriculture

USFS United States Forest Service

USFWS United States Fish and Wildlife
Service

USGS United States Geological Survey

WBAG Water Body Assessment Guidance

WLA wasteload allocation

Executive Summary

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC § 1251.101). States and tribes, pursuant to section 303 of the CWA are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list of impaired waters, currently every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. This document addresses the water bodies in the Raft River Subbasin that have been placed on what is known as the "303(d) list."

This subbasin assessment (SBA) and TMDL analysis has been developed to comply with Idaho's TMDL schedule. This assessment describes the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the Raft River Subbasin located in south central Idaho. The first part of this document, the SBA, is an important first step in leading to the TMDL. The starting point for this assessment was Idaho's current §303(d) list of water quality limited water bodies. Only six segments of the Raft River Subbasin were listed on this list (DEQ 2001). The SBA portion of this document examines the current status of §303(d) listed waters and defines the extent of impairment and causes of water quality limitation throughout the subbasin. The loading analysis quantifies pollutant sources and allocates responsibility for load reductions needed to return listed waters to a condition of meeting water quality standards.

The general physical and biological characteristics of the Raft River Subbasin (Figure 1) have a strong influence on the water quality of the subbasin. Land use in the subbasin is predominantly rangeland (\cong 43 percent). Irrigated agriculture (cropland and pastures) also exists in the subbasin where water is either pumped from the ground or diverted from Raft River. The major population center of the basin is the town of Malta. The subbasin contains two different water sources. The first of these is runoff from the snowpack and other precipitation events in the mountainous regions that surround the subbasin to the south, east, and west. The second is the Raft River Aquifer below Malta and Almo, which is part of the Eastern Snake River Plain Aquifer. These sources affect water quality to varying degrees. The water from the local aquifer has caused significant changes in the water quality of many of the streams of the subbasin, because in part, it is often the only water source to many streams throughout most of the summer. As a result, some of the streams and rivers maintain high quality water with sufficient flows to provide for fully supported cold water aquatic life (i.e., Raft River near The Narrows), while other streams and rivers throughout south central Idaho are dry. In the Sublett Range the karst geology leads to low amounts of runoff water from precipitation events being delivered to the streams, while large amounts of water are delivered to the streams from the aquifer.

Subbasin at a Glance



<i>Hydrologic Unit Code</i>	17040210
<i>Subbasin Drainage Size</i>	3,196.1 km ² in Idaho 3,919.1 km ² Total
<i>Total Streams</i>	3,861.0 km
<i>Perennial Streams</i>	901.9 km
<i>Total Listed Stream Length</i>	159.95 km
<i>Applicable Water Quality Standards</i>	<ul style="list-style-type: none"> ● IDAPA 58.01.02.200-General Surface Water Quality Criteria ● IDAPA 58.01.02.250-Surface Water Quality Criteria for Aquatic Life Use Designations
<i>Beneficial Uses Affected</i>	Cold Water Aquatic Life Salmonid Spawning Secondary Contact Recreation
<i>Pollutants of Concern</i>	Sediment Nutrients (Total phosphorus) Bacteria

Figure 1. Raft River in relationship to the state of Idaho.

The subbasin land forms, vegetation, topography, and precipitation can be defined by two ecoregions. The predominant ecoregion of the subbasin is the Northern Basin and Range. The Northern Basin and Range ecoregion is predominantly sagebrush-steppe, juniper-mountain lands. Most of the surface streams are intermittent or ephemeral in nature due to evaporation and low annual precipitation. Consequently, limited riparian habitat exists within the subbasin. Those streams that remain perennial usually form from spring sources in the more mountainous regions of the subbasin. Along these stream courses some riparian habitats persist.

Nutrients, bacteria, and sediment are the most common listed pollutants in the subbasin. These pollutants were listed on the six 1996 §303(d) listed water bodies within the subbasin. Other listed pollutants and stressors include dissolved oxygen, flow, temperature, ammonia, salinity, habitat alteration, and unknown. The SBA portion of the SBA-TMDL determines the current amount of each particular pollutant in each of the watersheds of the §303(d) listed water bodies. The SBA also determines what impacts to the beneficial uses each pollutant may have.

Key Findings

In general, the impacts to the beneficial uses were determined by assessing the biological communities and the limited water chemistry data available. When these two data sets were in agreement with one another, appropriate actions, such as completing a TMDL or delisting the stream, were undertaken.

The water quality of the Raft River Subbasin, in some areas, is of high quality. In other areas of the subbasin flow alteration is the most dominant cause for beneficial use impairment. Nutrients are a listed pollutant in Sublett Reservoir. It was determined that, to effectively reduce the amount of excess nutrients entering the reservoir, TMDLs should be developed on Lake Fork and Sublett Creeks, the two tributaries of the reservoir. However, in these reaches it was determined that total phosphorus (TP) was not in excess impairing the beneficial uses of the creeks. In the Raft River and other watersheds nitrogen compounds are not in excess of U.S. Environmental Protection Agency (EPA) “Blue Book” recommendations (*Water Quality Criteria* 1972. [EPA 1975]). Background TP concentrations at a Utah sampling site of Raft River averaged 0.101 milligrams per liter (mg/L) for the period of record. Total phosphorus concentrations near the end of the reach averaged 0.077 mg/L. In the reservoir, TP concentrations averaged 0.028 mg/L for the data set. Total phosphorus concentrations in the Sublett Creek Watershed averaged 0.061 mg/L over the period of record, while in the Lake Fork Creek tributary, TP concentrations averaged 0.098 mg/L for the data set. The target selected for the reservoir TMDL (0.050 mg/L TP) was used to assess the two streams feeding the reservoir. These guidelines were set by the EPA for TP concentrations in rivers flowing into lakes and reservoirs. A 49 percent reduction in TP will be required for nonpoint sources within the Lake Fork Creek Watershed and an 18 percent reduction will be required for Sublett Creek.

Flow and habitat alteration issues were not discussed in the SBA-TMDL due to current DEQ policy. It is DEQ policy that flow and habitat alterations are pollution, but not pollutants requiring TMDLs. The EPA considers certain unnatural conditions, such as flow alteration, a lack of flow, or habitat alteration, that are not the result of the discharge of a specific pollutants as “pollution.” TMDLs are not required for water bodies impaired by pollution, but not specific pollutants. These forms of pollution will remain on the §303(d) list; however, TMDLs will not be completed on segments listed with altered flow or habitat as a pollutant at this time.

Temperature, under the current standards, is a listed pollutant on Raft River. In other areas of the state bioassessment data conflict with current temperature information and water quality standards. This is likely the result of the state’s current water quality standards being derived from an outdated understanding of the cold water aquatic life’s temperature requirements. However, DEQ is proceeding with a temperature TMDL on Raft River. Currently, DEQ is participating in a regional review of temperature criteria, which is being organized by EPA Region 10. Following the conclusion of the temperature review, the temperature exceedance documented now in the Raft River will be reassessed and, if needed, temperature TMDLs will be completed on other segments or updated on the Raft River segment. To facilitate the development of temperature TMDLs based upon solar pathfinder

information, streams with fully supported beneficial uses and the average shade component of those streams, as measured by the solar pathfinder, will be used to develop temperature TMDLs within the Raft River Subbasin. These reference streams will be used to set the shade and thermal load components for temperature TMDL developed and presented in this document.

The following Tables (1-3) summarize the TMDLs to be completed, streams and pollutants retained on the §303(d) list, and recommended delisting actions as a result of the Raft River SBA.

Table 1. Streams and pollutants for which TMDLs were developed.

Segment	TMDL-pollutant	TMDL-pollutant	TMDL-pollutant
Raft River	Temperature	Bacteria	Sediment –Bed load
Sublett Creek	Nutrients – TP ^{a,b}		
Cassia Creek	Nutrients – TP ^a	Sediment –Bed load	
Fall Creek	Nutrients – TP ^a	Bacteria	
Lake Fork Creek	Nutrients – TP ^{a,b*}		
Sublett Reservoir	Nutrients – TP ^{a,b}		

^aTP = total phosphorus

^b completed to satisfy reservoir TMDL

Table 2. Delistings in the Raft River Subbasin.

Segment	TMDL-pollutant	TMDL-pollutant	TMDL-pollutant	TMDL-pollutant	TMDL-pollutant
Raft River - Utah to Malta	Sediment – TSS ^a	Dissolved Oxygen	Salinity		
Raft River - Malta to Snake River	Nutrients – TP ^b	Bacteria	Sediment	Ammonia	Dissolved Oxygen
Sublett Creek	Nutrients	Bacteria	Sediment	Dissolved Oxygen	
Fall Creek	Unknown				
Sublett Reservoir	Sediment	Dissolved oxygen			

^a TP = Total Phosphorus^b TSS = Total Suspended Solids**Table 3. Stream/pollution combinations retained on the §303(d) list.**

SEGMENT	TMDL-POLLUTANT
Raft River	Flow Alteration
Sublett Creek	Flow Alteration
Sublett Reservoir	Flow Alteration
Cassia Creek	Flow Alteration
Cassia Creek	Habitat Alteration